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OSS - 497/65

2 March 1965

Copy No. #2

MEMORANDUM FOR: Chief, CIA/PID (NPIC)

FROM : Chief, OSS/PID (NPIC)

SUBJECT : Report of Trip to [] on
19 January 1965

1. In discussions with [] of the Plans and Development Staff, [] of DDS&T, and [] of NRO, on 9 January 1965 it was decided that as part of the Dimview project an attempt should be made to determine by mid March of 1965 the optimum stereo convergence angle throughout the range of practical obliquity angles for a new camera system. Discussions were held on various techniques for obtaining the answer to this question and a decision was made to use a scale model prepared by the [] and to make photographs of this scale model at the various stereo convergence and obliquity angles to be studied.

3. In the [] facilities we discussed with these gentlemen the problem at hand and various ways of attaining the type of photography we required for our testing. We indicated to them that the convergence angles in question were as follows; ten degrees, 15 degrees, 20 degrees, 25 degrees, and 30 degrees. We were interested in these convergence angles at the following obliquities 0 degrees, 10 degrees, 20 degrees, 30 degrees, 45 degrees, and 60 degrees. Since the method which will utilize this material will be determining PI preferences by a pair comparison or ranking technique, it is not essential that the angles be precisely obtained. We indicated that tolerances plus or minus 3 degrees would be entirely sufficient for our purposes.

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4. After initial discussions, we went with the [] personnel to view the model, which is housed in an old theater in down town Lexington. The model is presently 8 by 8 feet on a side and situated on a 16 foot diameter turn-table located in a center of the stage of the theater. The proscenium has been covered with polyethylene film strung between 2 X 4's in order to conserve heat in the building since only the stage area with the model is heated. About 55 feet directly above the stage is a fly grid made up of wooden strips several inches apart over what used to be the audience area of the theater. The ceiling is 33 feet above the floor of the stage (see attachment A). A simulated sun is available on a cat walk approximately 30 feet high at the side of the stage. On a number of light bars situated above and all around the model are a series of auxiliary lamps to accurately simulate the effects of sky lighting.

5. We talked with the artist who has been constructing the model and with the [] engineers, and made a number of suggestions to increase the realism of the model. These included textural changes in earthen areas and the toning down of the reflectivity of vehicles railroad tracks and other objects. I suggested that the photographing of the model be made with three different rotations so that cross comparisons could be made during the testing phase to determine any effects of target angularity on the results. This would be accomplished by rotating the model between the successive photographs. The combination of rotational changes, sun changes, and obliquity and convergence factors are shown on a table in attachment B. The rotation of the model is shown by the Greek letters Alpha, Beta, Delta, and Gamma. The obliquities by Roman Numerals I through VI, and the convergence angles by letters A through F. Because of the difference in altitude when photographing from directly above the model and photographing from 30 degrees to 60 degrees, two different focal length lenses were used on the 35 millimeter camera taking the pictures. We asked that the completed photographs be placed between one by three inch microscope slides and the surrounding areas opaqued.

6. The resulting photography would attempt to simulate satellite photography at a scale of 1 to 100,000 at nadir with a ground resolution [] Do to limitations on the film and lense combinations available it was decided to make this simulation at a five to one ratio using a scale five times larger and a film with a granularity approximately five times larger than the 4404 film. Since the 4404 film has a granularity of .023 it was felt that a film such as Super XX with a granularity of .10 could be used. This five to one scale increase will also simplify the testing procedure and allow the use of standard [] Zoom microscopes since their resolution capability would preclude their use at the higher resolution limits.

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7. An approximate idea of the model content is shown by the photographs in attachment C. Shown here are a stereo pair taken from the balcony of the theater with a Leica camera, a color photograph of a section of the model and a vertical photograph of three quarters of the model. The quality of the resulting photographs from the present experiment will be greater than the black and white photographs shown in this attachment.

8. The validity of using a model such as this to determine photographic perimeters for camera systems has not, of course, been proved. There will be some who feel that real photography should have been used and that valid conclusions cannot be drawn from photographs of a model. My personal feelings on this matter are: First, that this is an extremely realistic model with detail existing far down into the area below the resolution capability of the photography. This is one factor that will tend to provide more realism. Second, the initial problem laid upon []

[] was to come up with an answer to the stereo obliquity question by whatever means they deemed best in the time specified. With this restriction laid upon them I feel that we must trust their judgement as to the validity of this method. Preliminary discussions with them have indicated that they feel that it will yield acceptable results. At a later date comparisons may be made by testing against real material and should the validity of the model procedure be proved, this technique will save much valuable time and expense in future studies of this type. I foresee only one possible factor which may tend to bias the results, this is in the decreased area covered by the photography when the model is photographed at oblique angles. In testing by the method of pair comparisons the subject is given a pair of vertical photographs and a pair of oblique photographs and asked his preference. Using real photography the oblique photographs would off set the loss of scale factor by an increased ground area factor. Using model photography the ratio of scale factor in going from a vertical to an oblique is realistic, however, the area covered on the film by the model is decreased proportionately. Whether or not this factor will bias the results remains to be seen. I have discussed this with [] and he feels that it is not a significant factor but that they will take it into consideration.

3 Attachments:

Distribution:

- Orig. - Addressee
- 1 - OSS Chrono
- 1 - OSS Subject
- 1 - []

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